In re Patent Application of:
PHILLIPS ET AL
Serial No. **10/706,211**
Filed: **11/12/2003**

REMARKS

This supplemental amendment is filed as a response to the Final Rejection of August 9, 2005, taking into account the comments presented in the Advisory Action of November 21, 2005. By the present amendment, Claim 1 has been amended in substantially the same manner proposed in the amendment filed November 9, 2005, in response to the Final Rejection of August 9, 2005. However, the current amendment to Claim 1 differs from the previous, non-entered amendment thereof, in that it corrects a wording error (the a), adds the word "pattern" after "grating", and specifies that the diffraction grating pattern or holographic image pattern has a depth that is substantially less than the predetermined thickness of the light transmissive substrate. As will be demonstrated below, Applicants respectfully submit that the definition of the invention in currently amended Claims 1 and 7 patentably distinguishes the same over the prior art cited in the Final Rejection of August 9, 2005, and thereby places the present application in condition for allowance.

As noted above, a Request for Continued Examination (RCE) Transmittal is being filed concurrently herewith.

Claims 1 and 7 are pending in this application.

Claims 2-6 have been previously cancelled.

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Claims 1 and 7 have been rejected in the outstanding Final Office Action of August 9, 2005, under U.S.C. 103(a), as being unpatentable over Uyama et al. (5,700,550), in view of Coombs et al. (U.S. Patent No. 5,214,530).

The statement of the Final Rejection of August 9, 2005, alleges that there are features of the claimed invention disclosed by Uyama et al, but acknowledges Uyama et al's failure to disclose that their transparent color-shifting evaporated layers include flakes comprising an absorber layer, a dielectric layer and a reflector layer. To supplement this shortcoming of Uyama et al, the rejection relies upon the patent to Coombs et al, stating that Coombs et al disclose an optical variable interference device, which has an observable color change at different viewing angles. The rejection then concludes that it would be obvious to use the Coombs et al device, which has an absorber layer, a dielectric layer, an absorber layer, a dielectric layer, a reflector, a dielectric layer, an absorber, a dielectric layer and an absorber layer that is broken into flakes, into the transparent color-shifting evaporated layers of Uyama et al. It is further alleged that one of ordinary skill in the art would be motivated to do this because Coombs et al. would provide Uyama et al. with additional observable color shift colors making it hard to forge.

The Final Office Action of August 9, 2005 further states that Uyama et al disclose a transparent hologram seal comprising a transparent base member, a release layer, a

hologram forming layer, transparent color-shifting evaporated layers, a color layer and an anchor layer and an adhesive layer (figure 8). The Examiner further states that Uyama et al. disclose that the hologram forming layer may be formed of thermoplastic resin such as polycarbonate, polystyrene or polyvinyl chloride (col. 5 lines 46-58).

In order to demonstrate what they believe to be inaccuracies in the above assertions in the Final Rejection of August 9, 2005, Applicants respectfully draw the Examiner's attention to Figures 1 and 8 of Uyama et al (copied below) and the patentees' own statements regarding these Figures.

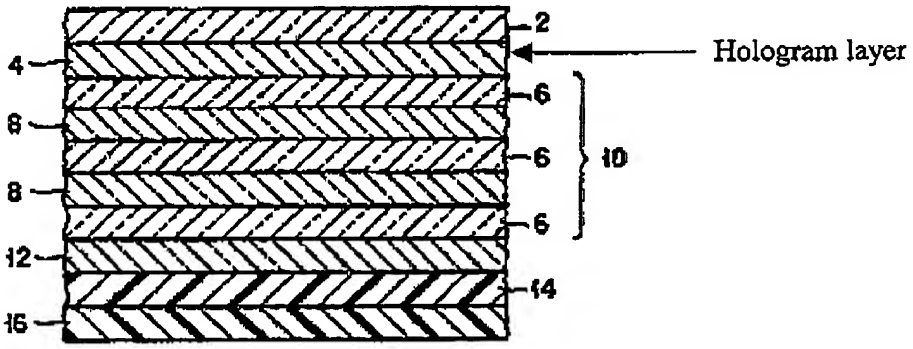

FIG. 1

Within the text of Uyama et al, the following description is given for Fig. 1;

"FIG. 1 is a cross sectional view showing the structure of the first embodiment. **A hologram forming layer 4,**

transparent evaporated layer 10, colored layer 12, adhesion anchor layer 14, and adhesive layer 16 are sequentially laminated on the under surface of a base member 2. **The seal** is affixed to an article by the adhesive layer 16 and **can be observed from above the surface of the base member 2 (upper side in the drawing).**" (Emphasis added)

"**Since the underlying layer is observed via the base member 2, the base member 2 must be made sufficiently transparent** and is preferably formed to have adequate rigidity (flexibility, tensile strength) and surface flatness. **For this reason, the material is not limited to a specified one, but a high polymer film such as a polyester film, or polyolefine film may be used, for example.**" (Emphasis added)

Applicants respectfully point out that, in the embodiment of Fig. 1 of Uyama et al, if the hologram itself were impressed or formed on the upper surface of the hologram forming layer 4 next to base member 2, the hologram itself would not be seen and would disappear, since the refractive index of the transparent polyester film or polyolefin film is very closely matched with the material employed for the hologram forming layer 4.

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In particular, Uyama et al state that:

> "The hologram forming layer 4 may be formed of thermoplastic resin such as polycarbonate resin, polystyrene resin, or polyvinyl chloride resin, thermosetting resin such as unsaturated polyester resin, melamine resin, epoxy resin, urethane (meta) acrylate, polystyrene (meta) acrylate, epoxy (meta) acrylate, polyol (meta) acrylate, melamine (meta) acrylate, or triazine (meta) acrylate, a combination of the above materials, or thermoforming resin having a radical polymerization unsaturated radical. Any of the above materials can be used if it can be used to stably form a hologram image. As the hologram image, a relief type hologram image having an image formed of a fine uneven surface is used, but it is not limitative."

In order for Uyama et al's device to function as intended and for the hologram to be seen, the hologram itself would have to be next to the layer 6 of the color-shifting coating 10; otherwise the hologram would disappear. In fact, Uyama et al describe the hologram forming layer 4 to be a low index layer and the layer 6 to be a high index layer, which of course would enhance the viewing of the hologram, providing the required contrast.

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The third paragraph of section 5, on page 4 of the Final Rejection of August 9, 2005, states that:

"Applicant further argues that Uyama does not teach that the color-shifting coating layer is formed on the second surface of the substrate, opposite the first layer. The Examiner disagrees, as shown in Figure 8 of Uyama the hologram layer is on the first surface of the substrate and the color shifting coating is on the second surface of the substrate opposite the first surface."

From the above-quoted statement, Applicants have inferred that the Examiner considers the "substrate" of Claim 1 to be Uyama et al's hologram forming layer 4, that the hologram itself is the first (upper) surface, and that the color-shifting coating is on the second surface of the "substrate" (hologram forming layer 4) opposite the first surface (of hologram forming layer 4).

It should be noted, at the outset, that Uyama et al are silent as to where their hologram is located on the hologram forming layer 4. However, it is respectfully submitted that a person skilled in the art, after reading the specification of Uyama et al., would conclude that the hologram itself is directly next to the color-shifting layer, since putting it next to layer 2, in Uyama et al's embodiment of Fig. 1, would make the hologram invisible, due to the index matching between the layers.

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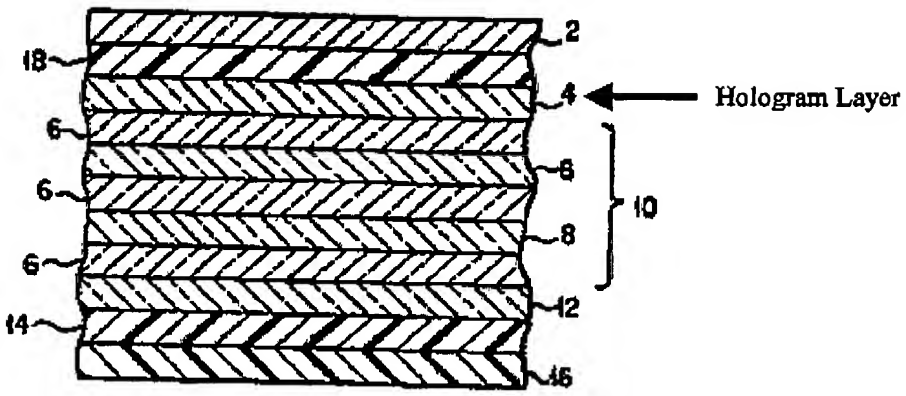

FIG. 8

Referring now to Uyama et al's Figure 8 (copied above), the patentees' description thereof is not instructive with regard to the location of the hologram structure itself. In fact, the layer 18, which is next to the hologram forming layer 4 in Uyama et al's embodiment of Figure 8, is said to be a "releasing layer"; however, if one reads the description of Fig. 8 carefully, it is clear that the actual hologram structure would have to be directly next to the color-shifting layers 10.

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With regard to the embodiment of Figure 8, Uyama et al make the following statement:

> "A hologram forming layer 4, transparent evaporated layer 10, colored layer 12, adhesion anchor layer 14, separating or releasing layer 18, and adhesive layer 16 are sequentially laminated on the under surface of a base member 2. Also, in the third embodiment, the colored layer and adhesion anchor layer may be omitted. **Further, in order to protect the hologram forming layer 4 after transfer, a transparent protection layer may be provided between the releasing layer 18 and the hologram forming layer 4. As the protection layer, plastic such as polyolefine, polyvinyl chloride, polyvinylidene chloride, polyvinyl alcohol, or polyethylene terephthalate may be used." (Emphasis added)**

If one followed this description of Uyama et al of disposing a protection layer of plastic next to the hologram forming layer 4 and, if a hologram were on the upper surface of layer 4, with the color-shifting coating on an opposite surface, as the Examiner suggests, then the hologram would essentially disappear (due to index matching, as discussed above).

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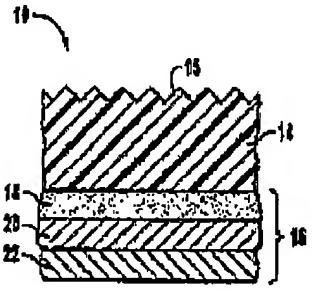

FIG. 1A

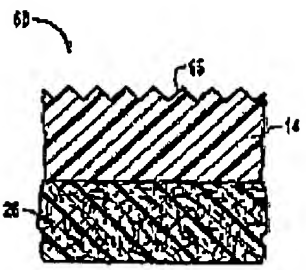

FIG. 3

Figures 1A and 3, copied above from the drawings of the instant application, show that the layer having the hologram impressed therein is substantially thicker than each of the layers making up the color-shifting coating, and that the diffractive grating has a depth that is substantially (orders of magnitude) less than the thickness of the layer in which the grating is formed. In such a structure, because the hologram itself is spaced a significant distance apart from the color-shifting layers, it appears to be floating on a color-shifting background.

In contrast, Uyama et al's hologram has a flat and lackluster appearance, due to the fact that the holographic structure would practically have to be directly adjacent to the weakly color-shifting dielectric layers. In Applicant's claimed structure, the incorporation of a layer of flakes comprising a reflector/dielectric/absorber spaced a significant distance from the hologram is what provides the preferred visual enhanced features over the washed-out appearance of Uyama et al.'s device. It should also be noted

that all dielectric-based designs are inferior, both with respect to color travel and chroma (color intensity or color saturation), to designs based on a metal/dielectric/ absorber structure.

In an effort to more clearly differentiate the present invention with respect to the patent to Uyama et al, Applicants have amended the claims in the following manner.

First of all, Claim 1, as currently amended, is believed to clearly define two structures on opposite sides of a light transmissive substrate having a substantial thickness compared to the depth of the grating. These two structures correspond to a hologram or grating, on a first side of the substrate, and a thin film interference color-shifting structure having flakes with a reflector, on a second side of the substrate.

Uyama et al do not suggest having these two optical structures on opposite sides of a light transmissive substrate. Disposing these structures in the manner recited in amended Claim 1 has a profound synergistic visual effect - a highly color-shifting device is provided, wherein the hologram appears to float in space. Furthermore, Uyama et al are silent as to the relative thickness of their hologram layer. In the Figures of the Uyama et al patent, this layer is shown to be quite thick relative to the described thickness of the dielectric layers.

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Uyama et al also disclose a transparent hologram seal that can be applied as a security article. As discussed above, from a reading of Uyama et al, one would conclude that the hologram and color-shifting layer are to be placed on the same side of a light transmissive substrate. The color-shifting layer is an evaporation coating layer comprised of alternatively arranged high and low refractive index layers, such that it changes color, as light either transmits or reflects through the layer, when the viewing angle is changed. The multilayer evaporation layer serves as a color-shifting multilayer optical coating. It should be further noted that Uyama et al's absence of a reflector layer makes their device inferior to Applicants' embodiment having a reflector layer yielding high chroma. For Uyama et al to have high chroma, their device is best placed on a black background. This requirement is obviated by Applicants' structure, by the inclusion of an opaque reflective layer within the flakes.

In contrast to the invention of Applicants' amended Claims 1 and 7, Uyama et al do not teach that the color-shifting coating layer is formed on the second surface of the substrate, opposite to the first surface of the substrate, (where the hologram layer is formed).

Conversely, in contrast to the teachings of Uyama et al, Applicants' claims define a structure, wherein the microstructural interference pattern is disposed (a predetermined distance) on the other side of the substrate,

from the color-shifting multilayer optical coating overlying the second surface of the substrate.

It should be clearly understood that placing the interference structure on the same or different sides of the substrate does not produce the same device. Such different locations of the interference structure produce profoundly different visual effects.

There is a significant and unexpected advantage to having a substantial separation between the microstructure interference pattern and the color-shifting coating. It ensures that the color of the hologram will be 'true', and not a result of significant interference between the hologram or microstructural interference pattern with the color-shifting coating. Applicants' claimed structure, having the hologram or interference pattern on the first side of the light transmissive substrate and the color-shifting coating on the second side essentially, provides a buffer between the color-shifting coating and the interference pattern, so as to obviate or lessen any interaction between the layers. The physical effect of this structure is a hologram that results in a more "true" color (keeps it as a rainbow hologram), and an optical effect, wherein the hologram seems to be floating on or above its background. The resulting image appears to allow the viewer to look behind or around the hologram. Namely, the structure defined in amended Claims 1 and 7 provides a hologram which preserves its integrity in the presence of a thin film color-shifting coating. The

structures disclosed by Uyama et al simply do not provide these advantages.

Because the instant invention requires placing the interference filter, such as a hologram, on the side of the substrate opposite to that of the color-shifting filter, a different optical effect is achieved, than placing it on the same side with the hologram. The thickness of the substrate, for example PET, typically of 12 to 25 microns, is sufficiently thick that one can see "under", i.e., "around and under" the hologram to view the color-shifting filter. This parallax advantageously gives the hologram an appearance of floating over a background of a color-shifting coating, that one does not have if both the hologram and the thin film filter are on the same side of the PET substrate.

Uyama et al do not explicitly state or show an embodiment wherein the OV coating and the hologram or grating pattern are on opposite sides of a substrate.

In view of the foregoing demonstration that the claims, as currently amended, are not taught or suggested by the prior art, it is respectfully submitted that the instant application is now in condition for allowance.

Early and favorable reconsideration of the Examiner's objections would be appreciated.

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Should any minor informalities need to be addressed, the Examiner is encouraged to contact the undersigned attorney at the telephone number listed below.

Please charge any shortage in fees due in connection with the filing of this paper, including Extension of Time fees, to Deposit Account No. 50-1465 and please credit any excess fees to such deposit account.

Respectfully submitted,

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CERTIFICATE OF FACSIMILE TRANSMISSION

I HEREBY CERTIFY that the foregoing correspondence has been forwarded via facsimile number **571-273-8300** to MAIL STOP RCE, COMMISSIONER FOR PATENTS, this 6 day of December 2005.